A Primer on Obstructive Sleep Apnea

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An editorial in the most recent *Federal Air Surgeon's Medical Bulletin* and the ensuing controversy that resulted from it dictates providing educational information on obstructive sleep apnea (OSA), regardless of the ultimate policy adopted by the FAA. The FAA position on sleep apnea is not new; the FAA has been evaluating sleep apnea and considering it a disqualifying condition since 1996. Unfortunately, guidance provided to aviation medical examiners (AMEs) about OSA has been lacking. The FAA has recently undertaken activity to update and provide more thorough guidance to AMEs on screening for the condition. The federal air surgeon recently stated that this new guidance will be published in the *Guide to Aviation Medical Examiners* in January 2014, specifying screening and documentation requirements for pilots deemed at risk for obstructive sleep apnea. Unless the FAA alters its announced plans, pilots can expect to encounter this new screening process in 2014 during their next medical exam.

Defining common terms in this discussion is useful. Body mass index (BMI) is calculated by dividing a person's weight in kilograms by their height in meters squared. A normal BMI range is 18–24.9. Less than 18 is considered *underweight*. A BMI of 25.0–29.9 is considered *overweight*, while a BMI of > 30 is considered *obese*. A BMI greater than 40 is termed *morbidly obese*. In the U.S. adult population, 35.7 percent are obese, according to the Centers for Disease Control, and mortality rate rises exponentially for BMIs greater than 30.

Sleep apnea is characterized by frequent intermittent cessations of breathing for greater than 10 seconds while sleeping (apnea) and/or reduced airflow with blood oxygen desaturation > 4 percent (hypopnea). Sleep apnea has several forms: obstructive sleep apnea (OSA) from mechanical obstruction of a person's airway, which is the most frequent form; central sleep apnea (CSA) from defective signals to breathe from the central nervous system, and a mixed form combining OSA and CSA. Obstructive sleep apnea is one of many sleep-related health disorders. This primer focuses on OSA since it has known identifiable risk factors and is the most common form.

Sleep apnea is usually diagnosed by a polysomnogram (sleep study) in a laboratory, but can also be diagnosed or excluded using various types of home studies. It is important to note the distinction between *symptomatic* OSA and the *diagnosis* of sleep apnea. Most people with sleep apnea are unaware they have it, not unlike many with high blood pressure or diabetes. The severity of OSA is scored using several tools, the most common being the Apnea-Hypopnea Index (AHI) in a sleep lab and either an AHI or a Respiratory Disturbance Index (RDI) in home studies and sleep labs. Screening for sleep apnea may be done with simple overnight oximetry (blood oxygen saturation) studies or some of the less sophisticated home studies, although the diagnosis of OSA may require more advanced types of home studies or a formal sleep study.

Mild OSA is present when the AHI is between 5 and 15 **and** OSA symptoms exist. This means the person has episodes of delayed breathing five to fifteen times in an hour. Many people with AHIs in this range have no symptoms at all. This group may not need treatment, either for medical or FAA certification reasons. *Moderate OSA* is defined as an AHI between 15 and 30, regardless of the presence of symptoms, while an AHI greater than 30 is termed *severe OSA*.

Common symptoms associated with OSA include excessive daytime sleepiness, fatigue, and impaired cognition. Other possible symptoms include snoring, gasping when sleeping, difficulty with short-term memory or concentration, frequent nighttime urination, reduced sex drive, morning headaches, irritability, and a feeling of unrefreshing sleep. People with mild symptomatic OSA and with moderate/severe OSA benefit from treatment in several ways.

OSA is associated with significant increases in the risk of congestive heart failure, atrial fibrillation, high blood pressure requiring medication, high cholesterol, stroke, heart attacks, diabetes, and depression. People with *untreated* OSA have a significantly increased health risk. This risk is substantially reduced after just two days of treatment. Untreated sleep apnea is associated with three times the risk for fatal and nonfatal cardiac events, primarily in those younger than 65. There is also an association with adult epilepsy and sleep apnea, as well as complications with surgery. Cognitive impairment from sleep apnea is common and improves with treatment. Each of these conditions presents a serious risk to one's health and aviation career.

A presentation from the Stanford University Sleep Center eloquently elaborated "The Relationship of Weight and Obstructive Sleep Apnea." A few highlights from this presentation are useful in understanding the concern over both conditions. Ironically, obesity is the biggest risk factor for OSA, yet OSA can lead to obesity. Treating one helps treat the other. The presentation points out:

- Obesity is the most powerful risk factor for OSA and the only evidence-supported treatable risk factor to improve OSA
- Other OSA risk factors include alcohol intake, smoking, nasal congestion, and menopause
- Physical risk factors include a large neck, recessed jaw, enlarged tonsils, high arched palate, and nasal obstructions, all which may collapse the airway when asleep
- Symptomatic OSA is present in 4% of middle-aged men and 2% of women
- OSA without symptoms may be present in 25–58% of men and 10–37% of women
- 70% of those with OSA are obese (30% are not, but may have the physical risk factors above)
- 40% of those who are obese (BMI > 30) have OSA
- For those with a BMI > 30, 26% have an AHI > 15 and 60% have an AHI > 5
- For those with a BMI > 40, 33% have an AHI > 15 and 98% have an AHI > 5
- An increase in BMI of 6 or an increase in waist or hip size of 13–15 cm (5–6 in) increases the risk of OSA by a factor of 4
- Adding 10 kg (22 pounds) doubles the risk of OSA
- Waist obesity is more associated with OSA than hip obesity or BMI, even in non-obese people
- Hormones associated with sleep disturbance lead to increased weight gain and appetite

- OSA reduces energy, physical activity, muscle energy, metabolism, and exercise performance, all leading to obesity. Treating OSA can lead to weight loss.
- Dietary weight loss significantly reduces AHI and oxygen desaturation, especially with high BMI

What is the message for pilots? Simple—OSA is a serious condition with significant health and career implications if left untreated. If you are at risk, get evaluated. The most common comment heard from pilots who have been treated for OSA is "I never knew I felt so bad before, until I felt so good after treatment." Give yourself a gift of health and career preservation. Don't let OSA ground you.

A few references from academically sound and unbiased sources:

- CDC section on *Overweight and Obesity* www.cdc.gov/obesity/index.html
- *Updates on Definition, Consequences, and Management of Obstructive Sleep Apnea*, Park et al, Mayo Clinic Proc. 2011 June; 86(6): 549–555 www.ncbi.nlm.nih.gov/pmc/articles/PMC3104914/
- *The Relationship of Weight and Obstructive Sleep Apnea*, Zaharna, Stanford Sleep Center www.stanford.edu/~davesv/Weight%20&%20OSA.ppt

Other informational sites on obstructive sleep apnea:

- National Institutes of Health www.nhlbi.nih.gov/health/health-topics/topics/sleepapnea/
- National Sleep Foundation www.nhlbi.nih.gov/health/health-topics/topics/sleepapnea/
- American Sleep Apnea Association www.sleepapnea.org
- American Academy of Sleep Medicine www.sleepeducation.com/sleep-disorders/sleep-apnea/overview-facts

For information on insurance coverage for testing and treatment for OSA, please contact your insurance carrier. Most insurance carriers cover the majority of costs associated with this condition as it is cheaper to treat OSA than to cover the medical complications associated with untreated OSA.

For questions on the implications of OSA and related conditions screening, diagnosing, and treating for pilots and controllers, as well as how they affect FAA medical certification, please see the AMAS home page link to sleep apnea policy at www.aviationmedicine.com . We continue to work with ALPA and FAA staff to streamline the certification process for pilots treated for sleep apnea to return them to the cockpit in the minimum time possible.